INTRODUCTION to the Fall 1997 Directory of Internet Service Providers

by Jack Rickard

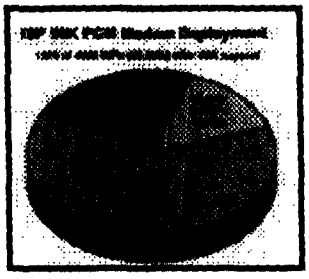
In this issue, we present 4,354 Internet service providers operating in the U.S. and Canada, including 37 profiles of national backbone operators and 83 national dial-up providers.

Growth in the number of everything continues. There is a great deal of commingling of body fluids as ISPs buy each other and other communications companies buy ISPs. WorldCom leads the news. The company had previously acquired the number-three backbone, UUNET, by acquiring MFS Communications. In October, they acquired Brooks Fiber, a 25 percent stakeholder in Verio. We've never determined if Verio was actually a backbone, and after conferring with Verio, we're pretty certain they haven't either. They do acquire both minority and controlling interests in various regional ISPs and more or less link them together. Their most recent acquisition was ClarkNet.

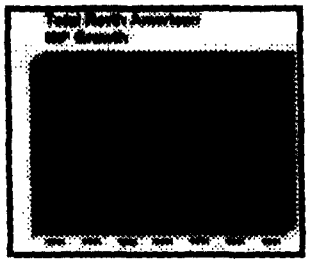
In any event, WorldCom also acquired CompuServe in total and granted the 2.6 million CompuServe subscribers, along with $175 million, to America Online in exchange for the ANS backbone previously purchased by America Online. The deal includes a rather fancy long-term, lease-back deal which effectively gets AOL out of the hardware business and makes WorldCom the leading provider of wholesale dial-up ports in the world, servicing AOL, the CompuServe subscriber base, and Microsoft Network- ostensibly some 12.6 million accounts all told. It remains to be seen how many of CompuServe's 2.6 million subscribers AOL can hold, as many appeared to be on CompuServe specifically to avoid being on AOL. The result could be a boon to local Internet service providers and most powerfully to smaller ISPs with a national dial-up network after the fashion of MindSpring.

Currently, there are rumors of a WorldCom bid to acquire MCI. WorldCom is apparently offering a $30 billion stock swap in the wake of the collapse of the British Telecom deal for MCI. But again, GTE, who recently acquired BBN Planet, is rumored to be preparing a $28 billion cash offer for MCI. Microsoft, meanwhile is buying into one of the largest cable companies, TCI, while continuing their work on the Teledesic satellite network.

ICG, a competitive local exchange carrier and metropolitan fiber provider, just announced they were buying NETCOM at $283 million. The much-touted "consolidation" appears to be well underway, with just one minor error in the pundits projections. The number of new players is increasing faster than the buyouts and partnerships can keep up with. In our last issue, we listed 4,009 Internet service providers. The current number is 4,354. The accompanying chart shows the growth in ISPs since February 1996. Numerically, the growth has been nearly linear at about 145 new Internet service providers per month. As a percentage, the growth curve is flattening but continuing.



The big question among ISPs and their customers alike has revolved around the deployment of the 56 Kbps pulse code modulation (PCM) modems. US Robotics, Rockwell Semiconductor Systems, Lucent Technologies, and Motorola had all announced some variation of PCM modems late last year. Rockwell, Lucent, and Motorola joined forces under the trademark K56flex, ultimately. US Robotics was much faster out of the gate with product under the x2 logo and seems to have totally dominated the retail shelf space with some 54 percent market share of desktop modems at retail. This has put some pressure on ISPs.

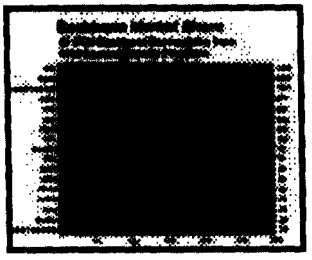


Unfortunately, switching hardware horses in mid-stream has not had much appeal to most Internet service providers. Most who found themselves in the Ascend Communications or Livingston Technologies camp simply bit the bullet and waited for ever-promised upgrades from the hardware vendors. There was some hope of an ITU standard in September but it didn't happen, and the companies have already broken into a fight over intellectual property and licensing. US Robotics notes a Brent Townshend patent filing for PCM modems, while Lucent Technologies notes three existing patents covering the same thing.

But despite USR's early lead in shipping both modems and central site equipment, both Ascend Communications and Livingston Technologies did finally begin shipping working equipment in July. Interestingly, Lucent Technologies announced in October that they were buying Livingston Technologies.

Currently, we see some 1,579 of 4,354 ISPs (36 percent) offering 56 Kbps connections. Of these, 610 support only x2 (14 percent) while 722 (16.58 percent) support the K56flex flavor. Some 247 ISPs (5.67 percent) support BOTH flavors of PCM modems. But the lion's share of Internet service providers (2,775 or 63.73 percent) don't support anything at this point. So most of the market is still up for grabs. But K56flex seems to have caught the x2 ship and moved past it, largely on the strength of the installed base of Ascend and Livingston equipment at Internet service provider sites.

We have received truly outrageous reports from both camps of thousands of ISPs adopting their technology. According to their reports, both camps have more ISPs "signed up" than quite exist in real time. In any event, the next ITU working group meeting is set for December, and if a draft is issued as a result of that meeting, an ITU standard would be forthcoming late in the first quarter of 1998. Given the muddled situation, we wouldn't bet either way on a December draft forthcoming.

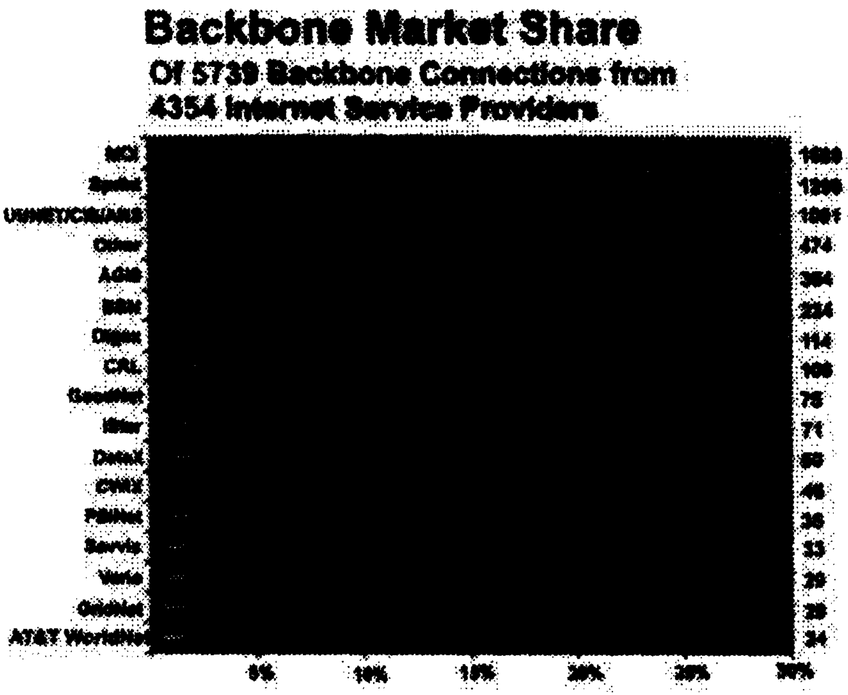


The question of backbone market share has come up quite a bit with the WorldCom bid for MCI. The accompanying chart shows what we know about it. First, while there are some 4,354 Internet service providers, they sport some 5,739 separate links to backbones. This makes sense when you consider that many ISPs "multi-home" to several backbones. MCI remains the leader with 1,689 connections. This represents 29.43 percent of the 5,739 connections and 38.79 percent of the Internet service providers. Sprint is second with 1,298 connections or about 22.46 percent of all connections. UUNET, with the newly acquired ANS and CompuServe backbones, sports a new total of 1,091 connections, which is right at 19 percent of all connections. We can see pretty readily that if WorldCom did acquire MCI, it would own 48.43 percent of all Internet connections, though it is less clear what total percentage of ISPs as there is already some overlap between UUNET and MCI among ISPs. In any event, it would concentrate an extremely large chunk of Internet access under the WorldCom umbrella with regard to backbone connections.

The typical ISP of October 1997 sports 3,019 subscribers, 18 employees, and services five area codes. This would indicate there are some 78,372 people working in the industry. The average price of a 28.8 Kbps dial-up connection remains stable at around **$19.78** per month for an average of 91 hours of service.

Also in this issue, we continue our measurement of Internet backbone performance with performance data on 34 of the 37 profiled national backbone companies developed in partnership with Keynote Systems, Inc. (http://www.keynote.com).

Jack Rickard
Editor Rotundus


Backbone Market Share
Of 5739 Backbone Connections from
4354 Internet Service Providers
MCI
CRL

ATTACHMENT C

EDITOR'S NOTES by Jack Rickard

THE BIG, THE CONFUSED, AND THE NASTY

UUNET RESIGNS FROM THE INTERNET—US WEST EXPRESSES CLUELESS GREED AND CONFUSION, THE FCC RULES ON ACCESS CHARGES

This season continues to amaze, confound, and perplex nearly all on the Internet. We do appear to live in the proverbial Chinese "interesting times."

Let's do the easy targets just so I'm not accused of dwelling on the cripples unfairly. About a year ago Bell Atlantic issued a truly moronic "study" indicating that ISPs were unfairly tying up the voice switches in telco central offices across the land and threatening the very utility of the switched circuit voice network. I initially dismissed this as so ridiculous that surely no one could take it seriously. In the absence of any apparent protest, all RBOCs went into a full scale cottage industry of issuing repeats and further data on this notion. In our March issue, I finally addressed this and in an attempt to appear fair, published, in full, US West's preposterous reply to the Washington State public utilities commission — concluding that if they were sincere they should be MOST anxious to assist ISPs in moving to dry copper LAD circuits and deploying xDSL as an alternate means of Internet access. I rather know that even ISPs can't deliver this at the current popular rate of $20 per month, and it would have little impact on any of that. But US West of course didn't. In truly mindless kneejerk fashion, within TWO WEEKS of the March issue hitting the street, their response was to apply in all fourteen states to remove LAD circuit tariffs. As these things work, this allows them to discontinue sales until it resolved in the PUCs. No LAD circuit sales after June 1, 1997.

I can think of no better demonstration of my concept of RBOCs as "manger dogs." They are sitting in the manger of global networking. They cannot themselves eat the hay, but they are desperate to prevent any who can from doing so. The only customers they can get for their own xDSL offerings at $175 per month, as it so happens, are those currently paying $650 per month for 1.544 Mbps T-1 connections. So they are about to cannibalize a VERY profitable data networking business themselves. It will have little impact on Internet connections aside from replacing the aforementioned $650 loops with $175 loops. But they have demonstrated empirically that the concept of anyone else using bare copper to offer services is anathema to them. Since this IS the model for competitive local access, they apparently not only don't mind being stupid and greedy in public, but they also intend to join the militia movement as totally lawless as well. The FCC is clearly going to have a tough time implementing the Telecommunications Act of 1996.

Worse, after collecting the money for all those second line installations, the RBOCs are preparing for competitive local access by basically letting their networks go to hell. And now they are blaming it on the Internet service providers. I tried dialing mom on Mother's Day, traditionally the busiest long distance day of the year, SEVEN TIMES without a connection. It isn't the Internet doing that gentlemen. While competitive access is tied up in court, the RBOC have essentially ceased investing in their networks and I have no doubt that the switched voice network will become increasingly unreliable. There is NO DOUBT they will then attempt to blame it on data networking and Internet service providers — don't believe it. It is a barefaced lie.

The FCC meanwhile, has unveiled their 1,100 page ruling on access charges and universal access. As I predicted, but still much to my relief, they did NOT bring Internet service providers under the per-minute access fees currently paid by long distance telcos. And they reduced those fees paid by long distance companies — not as much or as quickly as I would have liked to have seen, but reduced them nonetheless.

In the competitive local exchange carrier (CLEC) environment envisioned, the main concern is for the fate of "universal service." The theory is that new companies will "skim the cream" going after profitable business accounts while leaving the elderly, the impoverished, the rural, etc. to fend for themselves. I've never bought into the cream skimming theory, but it was very much in vogue even before divestiture in the early '80s. It was the MAIN argument against long distance competition. It doesn't appear to have had any impact at all in the reality zone. But that doesn't prevent the RBOCs from bringing it up again with regards to local competitive access. And so it has to be addressed.

The FCC did this with flat per-line access fees on second telephone lines — a little over $2 for residential lines and over $4 for businesses. This doesn't seem like much — but neither did the 3.5 cent per-minute access fee in 1984. This fee will come back to haunt us in gruesome ways four or five years from now.

But for the present, while it does increase costs for ISPs, it is more annoying than problematical. In fact, ISPs stand to benefit from it as a percentage of the proceeds go into a $2 billion fund to put libraries, schools, etc. on the Internet. My old buddy Dave McClure at the Association of Online Professionals, who we haven't ever been caught in the act of getting ANYTHING right the first time around, is predictably howling that this is the death of the Internet service business — unless of course they all immediately join the AOP. As best as I can tell, dollar wise it's probably a net gain for Internet service providers and depending how it plays out, potentially

a huge one. If it's entirely negative, it could drive a price rise of slightly over 40 cents per month in dial-up accounts — undetectable amidst the rounding errors without a serious investment in test instruments. If we throw out the top and bottom 10 percent of ISPs, it looks like about 10 million dial-up users and 1 million dial-up ports. At $4.75 per line, that's $4.75 million per month FROM ISPs collectively, and $2 billion going in their direction. Sign me up.

But the big issue of the day is boy genius John Sidgemore's amazingly cunning decision to DISCONNECT UUNET FROM THE INTERNET! In all honesty, I've been circling my office for two weeks scratching my, ahem...., ear..., and picking my nose trying to determine if I'm missing something here. There are two possibilities — Sidgmore is either the most brilliant man on the network and knows something no one else does, or he's pulled a boner the size of Idaho in public.

Basically, in March UUNET began sending a series of amazingly clear and at the same time totally cryptic e-mail messages to at least a dozen, and perhaps as many as 30 small backbones and ISPs notifying them of their intention to discontinue peering at various dates in late May and early June. They did allude to the fact that they might be willing to negotiate something if the ISP signed a FIVE YEAR non-disclosure agreement that would require a total frontal lobotomy to really be effective as worded. They can't actually say the WORD "Internet" in public for five years or they have infringed it.

All the secrecy surrounds proposals for these backbones to pay as much as $24,000 per month for peering at a Network Access Point — over a quarter million per year. This is, coincidentally, the approximate cost of a T-3 connection to UUNET as a customer. They basically intend to convert competing small backbones to customers or disconnect from them.

David Holub of The Whole Earth Lectronic Link questioned this and Bruce Katz, terrified of being "disconnected" by UUNET, — fired him. We found Mr. Holub's thoughts on the topic remarkably cogent under the circumstances and publish them in their entirety in this issue for your consideration. He brings up forty or fifty excellent points.

The UUNET public relations spin machine immediately went to work to portray this as the "end of the free ride for small players." Watching the general networking and computer media pick this line up unquestioned has exacerbated my ongoing and increasingly fully engorged gag/retch reflex with regards to the state of computer journalism today. It's a swamp. If you assume I'm a spraddle-legged whore with a numerically matching IQ and inseam, I forgive you. In the crowd I'm running with, how could you tell otherwise?

In any event, the number of "backbones" on the Internet has grown from about nine we could find a year ago to near enough 30 today. And it is quite true that many of them have made neither the dollar investment nor have the customer base that UUNET does. Some of them are pretty shaky. And a kind of AIDS hysteria has taken hold in that few want you to know that they have been "notified" for fear it will wreck their business plans. UUNET of course whispers to them that if they say anything, there will be no negotiations for peering. And so an insidious silence surrounds the issue.

To comprendo what is going on, you have to take a look at the peering issue. This is actually the THIRD episode where it has been used in an attempt to "steal" the Internet. And it is very interesting to go over the first two in order to understand this latest one.

In 1988, the Internet was a "backbone" operated under the auspices of the National Science Foundation to connect some supercomputer centers across the United States. It had existed as a 56 kbps network and in that year they upgraded it to 1.544 Mbps. Merit, a Michigan education and research entity that linked universities in the state, was chosen to administer the network. MCI and IBM joined forces to create a non-profit subsidiary titled Advanced Network and Services (ANS). ANS actually built the backbone. And they claimed to have both the public NSFNet backbone and their own private backbone, which were physically one and the same.

The concept of "privatizing" the Internet and allowing private companies to sell access to it was actually some time coming. ANS wanted anyone selling Internet access to pay THEM for peering to the NSFNet backbone. Rick Adams of Alternet (now UUNET) and Marty "Shaftsall" of PSI screamed like stuck pigs, threatened lawsuits, and cried like babies in public that IBM and MCI were going to "steal" the Internet. I can't make as loud a noise for as long as they did. And it was the first time I ever saw two people actually found companies on "crying" in public. Gordon Cook founded an entire new career in conspiracy mongering with an electronic (later printed) newsletter. The mailing list COM-PRIV was started from PSI, specializing in conspiracy theories with IBM as the spawn of the devil. The list grew to gargantuan size and popularity, espousing all the evils of ANS.

PSI and UUNET were actually the main forces behind the Commercial Internet Exchange. This was an equipment room in California that actually belonged to PSI. But the proponents declared that if you connected at CIX, you were connected to the Internet, and everyone bought into it. End of ANS aspirations to own the Internet.

But it was the beginning of little Ricky and little Marty's aspirations. In 1994, they announced that EVERYONE selling Internet access anywhere in the U.S. would have to pony up a $10,000 annual fee, whether they connected to CIX or not, or they would be "route filtered" at the CIX and they would be effectively off the Internet. They set themselves up as Internet Czar's and demanded annual tribute from every ISP in the land to the tune of $10,000. This then comprised the SECOND attempt to "steal" the Internet.

We editorialized on this topic in our September 1994 issue and in fact, I flew a hundred copies to Atlanta to the CIX meeting myself. We distributed them to all ISP attendees at the CIX reception (under the stairs — very poorly done reception actually) and spoke with most of the ISPs and CIX members attending. CIX's response was to close the meeting the next day to any non-members and most pointedly the press. The CIX board announced they were going ahead with the plan anyway, whether the members liked it or not and that route filtering would begin in November.

Karl Denninger announced that he had an equipment room in Chicago and he would be the CIX if everyone wanted. That was

the last anyone ever heard of CIX route filtering, or the $10,000. The CIX move was dead on contact – not from Karl's actually establishing a CIX – just from his mentioning that he could. CIX has spiraled toward total irrelevance ever since. Last year, one of the CIX secretaries approached us about participating in the ISPCON in August '96. We told them sure, come ahead, do sessions, whatever. No grudges here. But little Marty and little Ricky, still on the CIX board of directors, and still nursing a grudge over the '94 editorial two years earlier, said "no way" and killed it. Not that we noticed at the show.

And as close as we can tell, John Sidgmore and UUNET have offered to be the front man for the THIRD run at stealing the Internet. And while it appears to be UUNET, we have already amassed sufficient evidence of collusion from PSI and SPRINT to probably send someone to jail, but in any event sufficient to pull together a really interesting class action lawsuit that could potentially cripple all three companies. This does NOT appear to be a lone action by UUNET to end peering with a dozen smaller fry, but actually a conspiracy worthy of even Gordon Cook among large scale backbones to squash the smaller players. And it mostly hails back to the same little handful of would-be czars that screamed at the first attempt, perpetrated the second, and now are very dishonestly pulling the strings on the third from behind the curtain.

What I DON'T understand is why otherwise supposedly intelligent individuals actually think it will work. There are two basic problems, aside from the obvious impairment of anti-trust violations and government interference. First it's failed twice in a row previously. And second, if its a game of big fish crowding out little fish, neither UUNET or PSI are big fish.

Let's take a look at the second problem first. The table below shows some interesting relationships. We are listing the data we are closest to. That is, the number of Internet service providers who have connections to each of the major backbones in order of number of connections. Many ISPs have more than one connection, and so the totals don't add up to 100 percent.

Interestingly, we published this table previously and I spent a good deal of time qualifying and apologizing for it. It lists ONLY ISP connections and indicates

market share among ISPs only. PSI, interestingly, doesn't sell connections to ISPs — the greed thing again. But we have coupled this data with some traffic data from various largish ISPs, and amazingly the traffic patterns overall match our ISP market shares to within hundredths of a percent — with the exception of IBM Global Networks. They have some 30,000 business customers, and almost no ISPs — largely a pricing and cultural issue. At this point, I think it DOES INDEED represent true relative size of footprint. This appears to be coincidental, but I suspect that the ISP selection of backbones almost exactly matches business selections of backbones, with the lone exception of IBM Global Network.

This data is from 3,852 ISPs with a total of 4,455 connections. It indicates that each ISP averages 1.1565 connections to backbones. There is some serious multi-homing going on already. Assuming an average price of $2,300 per connection and further dubiously assuming an average connection of a single T-1, this looks like about $125 million in annual sales to ISPs.

But that's not the point. If the game is to be let the big fish eat the little fish, we rather immediately see that UUNET and PSI aren't any of them. InternetMCI is roughly TWICE the size of UUNET and Sprint IP Services is half again larger than UUNET. PSI doesn't even break the 1 percent market share here.

Now what immediately becomes obvious is that if UUNET's move is successful, and the smaller backbones ARE squeezed out of the game, there is only one next most obvious move for internetMCI and Sprint — and it doesn't bode well for PSI and UUNET. UUNET may derive some comfort from the fact that they were bought by MFS, who was in turn purchased by WorldCom. Actually it won't help much. There is no love lost at the higher levels between MCI and Sprint toward WorldCom. Whatever the network architects participation at this point might be, if the UUNET move works, it's liable to come down from the TOP to do the same thing TO UUNET and PSI.

And therein lies my puzzlement. The one man on the planet who would naturally hope that UUNET's ploy would fail would have to be John Sidgmore of UUNET.

The heart of it appears to be a kind of child-mind approach to greed. The thinking is that the smaller fries are mucking up the Internet with low pricing. I doubt it actually. There is a customer at every price level, and if truly competitive, a world of five or six backbones will render prices that will actually decline over the next year anyway. Eliminating the smaller backbones won't do much to pricing unless you have a pretty firm plan to cooperate on prices among the backbones that are left. And there just is no honor among thieves.

Worse, unless it develops pretty quickly, it won't work anyway and for the same reasons that it didn't work twice before. The Internet is a belief system, and that's hard to claim to own. Each smaller backbone that UUNET cuts off loses precisely one peer. UUNET has just lost thirteen. Part of this is the uneven nature of customers. A YAHOO or a *Wall Street Journal* can be a powerful draw on the Internet — but they count as ONE web site and ONE customer. All web sites are not created equal. If one popular web site disappears from the UUNET customer's screen, this takes a bad turn.

And UUNET customers are paying a higher price for a supposedly "premium" connection. They were sold a connection to the INTERNET. That's what they thought they were buying. If UUNET disconnects from even a portion of that Internet, it is actually running a private data network — not an access to the Internet. And any bumbling $70 per-hour new grad lawyer can turn their customer agreements into so much waste paper with little effort.

UUNET has to be hoping that both internetMCI and Sprint IP Services jump in and join them in this effort. Even if there is collusion going on here, those companies have charts and tables nearly as good as mine. The customers to be had for them are mainly with UUNET, not with DataXchange, GoodNet, or Digex.

Finally, there is a very real threat of lawsuits and legal action. And all of this to eliminate a set of backbones that taken all together don't comprise 8 percent of the market or traffic. If I were a WorldCom shareholder, I'd be screaming for Sidgmore's head on a wall plaque at world headquarters.

But wait — there's more. Many of these new and small backbones owe their existence to a very interesting development. They don't actually use expensive point-to-point leased telephone lines from AT&T, Sprint, or MCI to connect their hub cities. They use much less expensive private virtual circuits (PVCs), rented from a massive ATM network operated by a company, as Mr. Sidgmore's luck would have it, titled WorldCom. While these backbones don't take much revenue from UUNET, they do provide a bit to WorldCom.

The bottom line is that UUNET, continuing in the tradition of its founder, has been too tricky by half one more time around.

Backbone	Connections	% of ISPs	% of total connections
UUNET	[illegible]	[illegible]	[illegible]
AGIS	[illegible]	[illegible]	[illegible]
BBN	[illegible]	[illegible]	[illegible]
ANS	69	1.72%	1.39%
Digex	61	1.52%	1.23%
DataXchange	53	1.32%	1.07%
CWIX	46	1.15%	0.93%
Goodnet	46	1.17%	1.01%
PSI	31	0.80%	0.70%
NAPNet	23	0.60%	0.52%
GridNet	21	0.55%	0.47%
ATMnet	17	0.44%	0.38%
IBM	13	0.34%	0.29%
CAIS	10	0.26%	0.22%
NetCom	9	0.23%	0.20%
Savvis	5	0.13%	0.11%
CompuServe	5	0.13%	0.11%

How it plays out largely depends on the response of the customer community and the smaller ISPs. If life appears to go on as usual without a UUNET peering agreement, UUNET will find itself in a very awkward position. If the smaller backbones, with a large monthly fee going to maintain their networks, panic and sign up, UUNET will derive about $250,000 per year in gross revenues from them for peering agreements about what they would pay as customers.

Spinning it hard as the "end of free Internet" probably won't help. UUNET wasn't giving anything for free anymore than NetRail was. They both appeared at network access points, and they both advertised each others routes to their respective customer bases. That is what an Internet is and in a nutshell what peering is. UUNET has taken the first steps toward establishing a private data network with the profound hopes that their customer base won't notice and that the smaller backbones will in any event panic before they do. That's a risky strategy with no upside that we can tell, and huge downside. If they have to back off, it will be very embarrassing. And if they win, internetMCI will squash them like a bug. And in the meantime, about a dozen millionaires are trying to decide whether to sue them or get the Justice Department to do it for them.

There is another side to all of this. There were a lot of very small regional players who had no national backbone at all trying to peer at the network access points. They probably SHOULD be customers instead of peers. The problem becomes one of drawing of lines. You don't want AOL dial-up customers demanding to dial-in to the NAP and "peer" with a 33.6 kbps modem for example. Peering does involve a certain amount of co-mingling of body fluids. In accepting route advertisements from a "peer" at a NAP, you are basically giving someone else the power to wreck your network. The concept of free for all peering just isn't technically plausible given the current architectures.

On April 25th, a few days after *Infoworld* columnist Bob Metcalfe "ate his column" that had predicted a massive collapse of the Internet sometime in 1996, MAI Network Systems received a "full view" set of routes from one of their customers who was experimenting with multi-homing. A couple of things happened as a consequence. MAI did not have adequate filtering in place first. Second, their Bay Networks BLN router apparently has a bug in it that caused it to disaggregate about 20,000 routes and spew them forth to Sprint. Sprint, who uses AS-PATH filtering apparently, didn't filter them out and instead promulgated them to the rest of the world. Some 20,000 networks as a result were blackholed into MAI for a couple of hours.

This is an unlikely series of mishaps operating in congruence. MAI is reasonably well respected within the Internet. They immediately unplugged, called the Sprint NOC, and were completely open and honest about what happened. The Net was hosed really for only a couple of hours as the result of quick action by MAI, Sprint, and a lot of cooperation among the netheads at the NOCs among them. But it illustrates that peering is really a comingling of network body fluids, and you can get sick from your partners.

But the solution is to publish a clear, consistent, reasonably time stable and definitive set of criteria for peering. MCI is doing this pretty consistently now — national backbone, presence at three out of four NAPs, 24x7 network operations center, published trouble escalation procedure, and some demonstrated networking expertise are the basic requirements. They can be a little slow to make the move, but they are consistent moves.

Sending secret e-mail messages with secret non-disclosure agreements, unilaterally dropping peering agreements, sucking up to the press with stories of ending "free Internet access to parasites" and otherwise skulking about in the shadows, is NOT the way to do it. And I would predict UUNET will pay the price, again, for these tactics.

To try to increase the level of comprehension on this peering issue, we've been busy building a peering matrix out of several vertical FEET of printed traceroute data. We think it will be an eye opener for almost everyone, including some of the backbones themselves. It's already gotten to be a bit detailed for ***Boardwatch***, so we're going to publish it in the next issue of our ***Directory of Internet Service Providers***. Looking at what's in front of me now by way of early work, I think it will probably cause cranial detonations across most of a continent on release.

One final note, the **Internet Service Providers Convention** (ISPCON'97) is scheduled for August 20-23rd at the San Francisco Hilton and Towers Hotel. As of this writing in the first week of May, vendor exhibit space is entirely sold out, we have more ISPs registered NOW than attended the event in August 1996 — and hotel rooms are already starting to look like a problem. Robert Pepper, Chief, Office of Plans and Policy at the FCC, has agreed to keynote with an address describing in more detail the ongoing FCC notice of inquiry regarding the Internet, as well as the new access fee rulings. We're out of control. More at **http://www.ispcon.com**. You're not going to want to miss this party.

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UUNET DETAILS PEERING STRATEGY

CHANGING INTERNET ECONOMICS PROMPT NEW POLICY

FAIRFAX, Va., - Stating that the economics of the Internet have changed radically in the past few years, UUNET Technologies Inc., the world's largest Internet service provider and a subsidiary of WorldCom Inc., today detailed its policy regarding peering with other ISPs. The company said it will continue to peer with ISPs that can route traffic on a bilateral and equitable basis. However, UUNET will no longer accept peering requests from ISPs whose infrastructures do not allow for the exchange of similar traffic levels.

"A few years ago all ISPs were generally the same size and used each other's infrastructures to a more or less equal extent," said John Sidgmore, president and chief executive officer of UUNET. "Today that situation no longer exists and consequently there are many cases where peering is not appropriate."

One of the major principles of UUNET's policy is to peer with ISPs that operate a national network with a dedicated, diversely routed DS-3 (or faster) backbone, and which will connect to UUNET at DS-3 or greater speeds in at least four geographically diverse locations.

Peering is an arrangement whereby "peers", or ISPs of similar size, route each others' traffic to destinations on their respective networks. Because the flow of data and use of infrastructure are anticipated to be approximately equal in both directions, no money changes hands in peering relationships.

UUNET said it has received numerous peering requests from small regional ISPs and companies which provide "web server farm" services rather than Internet networking. These are, in effect, requests for UUNET to provide national and international data transport, as well as connectivity and support services, to companies which do not have the ability to provide similar services in return. Essentially, companies requesting peering in these situations are seeking to use

UUNET's network for free, after UUNET has spent hundreds of millions of dollars to create its infrastructure.

"This is a purely economic decision," Sidgmore continued. "We are 100 percent in favor of interconnection and won't deny access to anyone. However where the use of our respective infrastructures would clearly be imbalanced, we cannot reasonably be expected to provide our transport, route management and support resources at no charge."

For those ISPs, or web server farms, seeking transport and route management services from UUNET, but which do not qualify as peers, UUNET offers wholesale connectivity services beginning at monthly rates of $2,000 for T1 connections and $6,000 for fractional T3 connections. UUNET currently provides such wholesale connections to several hundred ISPs.

UUNET's network consists of a global backbone with multiple DS-3 (45 million bits per second) links on all major routes. It has an aggregate capacity well in excess of 5 gigabits per second. UUNET recently announced it was making a $300 million investment in its infrastructure which would quadruple dial capacity and raise the speed of backbone routes to OC-12 (622 million bits per second), dramatically increasing capacity.

About UUNET Technologies
Headquartered in Fairfax, Va., UUNET Technologies, Inc. is the world's largest provider of Internet services, offering a comprehensive range of access options, World Wide Web hosting services, security products and consulting services to businesses, professionals, and on-line service providers. The company's network is comprised of nearly 1,000 POPs throughout the United States and in Canada, Europe and the Asia-Pacific region, as well as connections to Internet service providers around the world. Founded in 1987, UUNET is recognized as the first commercial Internet service provider and is a subsidiary of WorldCom, Inc. (NASDAQ:WCOM). UUNET's World Wide Web address is http://www.uu.net.

WorldCom is a global business telecommunications company. Operating in more than 50 countries, the company is a premier provider of facilities-based and fully integrated local, long distance, international and Internet services. WorldCom's World Wide Web address is http://www.wcom.com. The common and depositary shares of WorldCom trade on the Nasdaq National Market (U.S.) under the symbol WCOM and WCOMP, respectively.

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ATTACHMENT E

EDITOR'S NOTES

by Jack Rickard

LAWLOR CRUCIFIED AND SIDGMORE'S PENNY PER PIXEL FANTASIES

This may be the most interesting industry ever spawned.

We have two very interesting developments for this issue. First, the spam thing is reaching critical proportions, and as an industry, we've probably just done one of the dumbest things possible in a pretty broad universe of readily available dumb things. Second, in the ever continuing game of dancing with elephants, we find ourselves in the at least interesting position of doing it during some frenzied elephant mating.

This past month, a federal judge ruled in a dispute between the Apex Global Information Service (AGIS) and Sanford Wallace's Cyber Promotions. The ruling was almost moronic, addressing no substantive issues with regards to Mr. Wallace's ever popular activities in delivering millions of e-mail messages to millions of e-mail boxes despite an almost universal desire for him and his spam to eat feces and die.

Rather, the case was a niggling interpretation as to when and if AGIS could disconnect Cyber Promotions from the AGIS backbone. Basically Phil Lawlor threw in the towel and joined the ranks of ISPs adopting "spamming policies." The judge ruled he would have to observe a 30-day termination notice and couldn't actually do the disconnect before October 16.

I would like to publicly apologize to Phil Lawlor and the entire Internet community for not taking a stronger stance on this earlier. We did do a bit of a spot on it earlier in the year, but it was a delegated story and I should have done it myself. There were a lot of other things happening at the time and I was remiss.

Phil Lawlor was dead on right in public on the spam issue, and the rest of the ISP community simply lacked the summary intellect to deal with it. Those that opposed him did so in cowardly, but at least predictably moronic fashion. They won. And they will pay the price for this many, many times over for years to come.

The situation is broadly complicated by the fact that spam has become an epidemic. Even a live-and-let-live libertarian such as myself can just barely contain Internet road rage at the deluge of crap in my e-mail box. If I HAD a penny for every "make a million dollars at home" scheme I receive by e-mail, I probably would have made the million and be at home. And I really don't need to receive an e-mail solicitation to come find dirty pictures on the Internet – I was finding them long before these people knew there was an Internet – not that I needed them then either. But the public roaring, threats, and muscle flexing by Internet service providers, largely led by Paul Vixie et al, is just pathetic. Worse, it is grossly damaging to the future of Internet service providers throughout the land.

Phil Lawlor took the public position that Internet service providers are not responsible for content of e-mail, web sites, etc. His story was that he runs a network and operates computer equipment and that what people did with their properly paid for Internet connections wasn't any of his business. Take it up with them directly.

It was precisely the correct position in a LOT of ways, but he was beaten to death by his own peers over it to such a degree

that his network wouldn't work very well anymore. Ostensibly "hackers," but widely known to us all as other ISPs, flooded his system with every kind of attack from simple e-mail tornadoes to syn-flood attacks to who knows what in an attempt to punish him for "harboring spammers." ISPs were unsympathetic to his position most probably based on the obvious, if minuscule, economic gain AGIS derived from the Cyber Promotions account. It made Lawlor's position appear insincere. I rather gather it was quite sincere. At ISPCON'97, we had other ISPs parading around in T-shirts denigrating AGIS for their position, and Lawlor looked harried, frenzied, and beaten. I meant to say a kind word but was too busy giving away a Hummer.

The mindless concept at work here is that if ISPs all adopt an anti-spam policy, then spam will go away. I guess I think it has already been adequately and empirically demonstrated that this is nonsense. I certainly hope it is nonsense. Because if there is any truth to it, the ISPs will demonstrate once and for all that they CAN control the content and activity of their users. They will have abandoned the Whole Earth Lectronic Link's very astute position that you as an end user are responsible for your words. And Internet service providers will have publicly assumed responsibility for regulating spam – along with any other politically correct sin du jour.

That is an enormous leap. Spammers are not responsible for spam. Internet service providers who fail to regulate spammers are responsible for spam. Very interesting. How about web sites? Only web sites with truly "hateful" or socially unacceptable content? Or just politically incorrect web sites?

First, there are literally dozens of victim advocacy groups ever ready to get a little press for causing any change anywhere that serves their cause. The next step is for a women's advocacy group to pressure an ISP to stop "harboring" a web site with photos of violence against women. Or perhaps it will be an anti-defamation league mounting an online demonstration against an ISP with anti-Semitic literature. Or the NAACP raging against a Ku Klux Klan web site. Have I carried this to an extreme? It's already HAPPENING gentlemen. But there is still a little wee bit of uncertainty if the Internet service providers should actually be where the pressure is applied. Nobody really believes that the ISP shares these views. But they are a convenient and possibly effective pressure point.

That Lawlor did cave and kick Cyber Promotions off his service pretty much legitimizes this position. I would look for a LOT of pressure on ISPs from pressure groups to regulate a LOT of online activity. And as it gets to be the thing to cater to this caterwauling, you can look for it to become a nearly full time job policing who's offended by what on the Internet. But worse, once this is established, I look for a lot of state and federal legislators to look to ISPs as well.

We have a long and notorious history in this country for finding someone in the community to collect our taxes for us (employers are a good pressure point), be able to track the movements of individuals (let's use airlines – we'll call it security and the public will buy it) etc., etc., ad nauseum. I assume everyone now knows that teachers and doctors are REQUIRED by law to report any injuries or observations that MIGHT imply domestic violence or child abuse. You DID know this law was passed didn't you? What information passes between you and your doctor is privileged, just between you and the doctor and the state and any appropriate law enforcement entities that might want to know. It's not that the doctors CAN report it, they are themselves liable for criminal charges if they FAIL to report it. This is solely because they have something to lose and are a convenient pressure point to "regulate" this stuff for the greater good of the state. Kind of little deputy dawg doctors. They're like sheriffs, but not quite so much so.

If ISPs can regulate spam, which is just annoying, why can't they get this child pornography thing under control as well. If it saves even ONE CHILD, it's certainly worth it, right? We'll make the ISPs responsible for that too. In fact, there is a huge problem coming with all this electronic commerce. How can we regulate which e-mail carries money, and which is just a love letter? You didn't think this tax free zone was going to last forever did you? We can make them little deputy sheriffs just like doctors and teachers. Of course, we need to know who they are, so let's license them. And we DO want to know they are in "compliance" don't we? Annual reports, or quarterly reports or monthly reports are not too much to ask. Wineries have to do it. Medical offices have to do it. Why should ISPs get a free ride? And of course, if anything we want to regulate slips through, we do have someone with money and cash flow to go after either criminally or through the civil tort process. They are after all responsible. They have the control.

This has all gone down before. In CompuServe vs. Cubby, CompuServe was exonerated because they had no editorial control. In the more recent Prodigy case brought by a securities dealer, Prodigy lost because they DID exert editorial control, albeit a trivial amount in an unrelated area. Prodigy was actually held liable for the libelous CONTENT of an e-mail message in an online forum.

The spam heroes have just made a public demonstration of editorial control of electronic mail by Internet service providers. And I can't imagine it actually even slowing the flow of spam by as much as seven or eight e-mail messages. "Spamford" Wallace will do just fine – even without AGIS unfortunately. There is too much Internet. There are providers all over the world and Spamford could care less what the machine looks like or where it sits when it is spewing forth its e-mail poison.

I've long been annoyed by voice sales calls myself. Most people have. I don't agree that anyone has a right to use the telephone I buy and pay for as an advertising medium to call me from dinner. But you didn't hear the telcos banding together to ostracize any telco that "harbored" telemarketers. It's an

absurd notion. People got answering machines instead and today telephone solicitations are actually on the down trend because it is just too expensive to dial 100 consumers in the hopes that seven of the hapless yucks haven't gotten the word yet about voice mail. It still goes on, but nothing like it did 10 years ago. It was not unusual for me to get six or seven calls in an evening then.

But it is now open season on Internet service providers -- the responsible party from here on out. By ostracizing, harassing, and abusing one of your own, you bring to bear forces that many of you apparently do not understand even around the edges. Not just dumb -- dumb in public. ISPs have, with this act, stupidly stood up and VOLUNTEERED for this duty.

The other fascinating development is premarital sex among Internet elephants. WorldCom is the most interesting case. WorldCom was founded as LDDS in 1983 in preparation of the divestiture of the Bell system. They entered the long-distance market and did sufficiently well thereby that they bought Metromedia's long-distance business in 1993 for **$2.2 billion**. In 1994 they picked up both the satellite firm IDB for **$700 million** and WilTel's fiber network and spanking new Internet service for **$2.5 billion**. In 1996, Metropolitan Fiber Systems -- renamed MFS Communications, bought UUNET and WorldCom almost immediately bought MFS. MFS already operated a number of Metropolitan Area Ethernet facilities, including MAE East, one of the four network access points designated by the National Science Foundation. In August of this year, WorldCom bought both CompuServe from H&R Block, and ANS from America Online. That sounds like WorldCom has bought at least five backbones in the last three years.

Despite the fact that data really only accounts for some 7.1 percent of their current **$6 billion** in annual revenues, the company has a strong ethos that in the future, data will be king and circuit-switched voice will become an anomaly. This month they have announced purchase of Brooks Fiber, which is a significant investor in Verio -- a pseudo backbone. And this week they have noted they wish to buy MCI in a stock swap amounting to some **$30 billion**. MCI had supposedly BEEN bought by British Telecom, but after MCI lost some **$800 million** in the local phone market, BT wanted to re-negotiate the deal and it was quickly coming unraveled. Bernard Ebbers, head of WorldCom, announced their plans shortly after the first of October and when asked if he would consider a three way deal with British Telecom, he wryly noted that once they had the MCI deal done, he might consider purchasing BT as well.

If consummated, and there is no indication from MCI management that they would view this favorably, WorldCom would have a most interesting strangle hold on the Internet. First, between UUNET, ANS, CompuServe, and MCI, they would have a minimum of 60 percent of the world's Internet traffic flowing through one part of their network or another.

Interestingly, they still wouldn't have it all. AT&T is just now turning on the PR machine for their new backbone. We've been covering it since spring in the *Directory*. But more details are forthcoming. And it looks pretty good at this point. They have engineered a new backbone from scratch, and it has some elements to recommend it. But recall that GTE just bought BBN Planet earlier this year for some **$616 million**. As it turns out, AT&T and GTE are now dancing with an eye toward AT&T acquiring GTE. This would put them BACK in the local telco business, as well as picking up GTE's Internet services and a bit of a customer base for their new backbone.

And now it would seem that another voice telco -- local exchange carrier ICG Communications, Inc. -- has offered some **$283.5 million** in ICG company scrip (stock) for NETCOM On-Line Communications Services, Inc. So there does seem to be some consolidation occurring -- among now 40 national backbone operators.

What does all this dancing of elephants mean? A couple of things. First, it's no longer a hedge. The large voice companies have caught on that packets are packets and that voice is eventually going to go to a data network somewhere. This actually has huge implications. The long-distance voice telephone world is now a **$100 billion** market. If it moves to data networks, particularly flat-rate data networks, this shrinks rather alarmingly. I think that is a good thing and will spur the rest of the business world dramatically as their telecommunications costs drop. But it isn't necessarily good for telephone companies. The per minute charges for telephone service make no sense, have never made any sense, and all the studies of usage in the world funded by telephone companies will never allow it to make any sense. The Internet has demonstrated this with sufficient veracity that large telephone companies do indeed want control of it.

Which brings us to the second implication -- actually a revisit. At the time of the privatization of the Internet backbone there was quite a bit of grousing from Sprint Communications as well as MCI about flat-rate pricing and how all that had to end. There were even some tentative steps toward it within those companies, which all failed rather ignominiously but at least quietly. The problem was that there were flat-rate alternatives. And given a choice, even a bad choice, consumers ALWAYS choose the flat-rate pricing. Metered pricing can only exist in any stable form in a monopolistic scenario. So any attempt to introduce metered pricing results in a sudden and dramatic market share movement to whoever is offering flat-rate pricing.

I don't think that can change. But there can be sufficient disruptions of service by those who don't understand this to be bothersome. Clearly the sentiment within WorldCom, at least as expressed by John Sidgmore and the other brilliant visionaries at UUNET, is that all of these little ISPs and backbones are "getting a free ride" and disrupting the opportunities for profit. I have regularly heard from many who should know better, that a **$19.95** flat-rate is not sufficient to provide a profit adequate to provide the communications infrastructure. I have difficulty addressing this since most of it is a bit obvious. But let's take a bit of a look anyway. Right now, several companies have gone after what is coming to be known as wholesale dial up services in a big way -- including PSI, BBN, and Indeed

UUNET. This is basically providing the ports and connectivity infrastructure WITHOUT the customer support and marketing parts. And another segment of the Internet, represented by companies such as EarthLink and MindSpring, buy this wholesale dial-up service, and then add the customer support and marketing, charging **$19.95** per month.

How much is the markup? As best we can tell, the basic infrastructure can be had in bulk for **$7** to **$9** per month. I have to assume this does include some level of profit. Even with technical support included, it runs **$12** or **$13** per month. So it is simply not true that **$19.95** cannot support the infrastructure. But the going rate for pure infrastructure would appear to be **$7** to **$9** per month depending on wholesaler, contract term length, and volume.

In any event, the WorldCom move probably heralds another run at penny-per-pixel pricing. Sidgmore is publicly railing against flat-rate pricing and inexplicably blames AOL, who went to flat-rate pricing just 10 months ago to compete with the likes of UUNET, for it all. In any event, PPPP will fail, and it won't be a mixed failure. It will fail completely and for the same reason it has always failed before. If anyone doesn't buy in — say a Qwest Communications, or anyone else capable of providing the actual fiber routes, any one of now 4,535 ISPs can rent some fiber, declare themselves a backbone, and the 60 percent or 70 percent or even 90 percent of the Internet facing penny-per-pixel pricing will simply move to PSI or Qwest or AT&T or whoever is hungry enough for market share to operate an Internet in the fashion already demonstrated. Qwest, which is busy installing 13,000 miles of fiber along Phil Anschutz's Norfolk and Southern railroad right of way, just bought Colorado SuperNet. They completed at **$220 million** IPO just a few months ago.

In any event, if WorldCom does assimilate a sufficient amount of the Internet, they can always refuse to peer with the flat-raters. But that strands THEIR customers as well as the competitors — the basic conundrum of Internetworking. A visceral understanding of this is requisite to successfully operate an Internet company.

But I would look for some serious disruptions of the network while training some of these high-powered intellectual giants and executives along the way. And the mating of elephants will continue in an ongoing if frustrated quest to try to get a stranglehold on the Internet. It's like trying to choke a jello snake by the neck in a room full of Wesson oil. Maybe you could do it if you were just a bit bigger?

One further interesting thought by way of pouring gasoline on the fire. AT&T reports an average daily call volume of 230 million calls during the month of August 1997. And they have, by all accounts, 48 percent of the long-distance market right now. That means that in the United States, we are currently placing nearly 480 million long-distance calls per day — more on Mother's Day and holidays of course. These calls average about 5.5 minutes each in duration. It takes about 24 KB of data to do a second of voice in compressed, and not terribly good, form. That's 3.8 X 10^{15} bytes. Or in other words 3,800 Terabytes more or less in data traffic terms to handle all the voice traffic in the United States for a day. That's a lot of data. The best estimates we can find would indicate a total Internet aggregate traffic of about 3,000 Terabytes per MONTH. If just 5 percent of this voice traffic moves to the Internet, we will see an increase of 190 Terabytes per day on a network that in total aggregate currently does about 100 Terabytes per day. If you really want video with it after the fashion of the 1964 World's Fair, this will, ahem...increase. Bottom line, voice can't move to the Internet in any orderly fashion. To move a paltry 5 percent of voice traffic to the Internet requires at least three times the current Internet backbone capacity. It's probably worth noting the scale of this thing when talking about it.

Get ready. This is going to get worse before it gets better.

Jack Rickard ◆

CERTIFICATE OF SERVICE

I, Rudolph J. Geist, hereby certify that a copy of the foregoing "Petition to Deny and Request for Hearing" was served this 5th day of January 1998, by first-class, postage prepaid mail to the following:

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